Metal reinforcements for sealing strips and the like and methods of making them.

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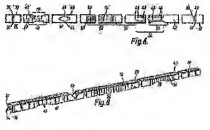
A metal carrier for a sealing or trimming strip or the like, for attachment to a flange surrounding a particular door or similar opening on a motor vehicle body, is manufactured from a longitudinal metal blank by performing thereon a number of different metal cutting operations. As shown in Figure 6, apertures 38 and 72 define the ends of a particular length of carrier though do not completely severe the metal blank. At a region 42, the blank is unslotted. Over regions 44,52 and 66, different formations of slots are cut. A diamond-shaped aperture is formed at 62. The various cutting processes produce a channel-shaped metal carrier (Figure 8) having different slot formations along its length and thus having different characteristics to suit the different requirements at particular positions around the door opening.; The diamond-shaped aperture 62 produces a V-shaped notch where the carrier may be bent at right angles to form a sharp corner. Apertures 38 and 72 facilitate precise cutting off of the length of carrier. The cutting operations may be performed continuously and automatically, according to a predetermined program, along the length of the blank.



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(54) Metal reinforcements for sealing strips and the like and methods of making them.

(57) A metal carrier for a sealing or trimming strip or the like, for attachment to a flange surrounding a particular door or similar opening on a motor vehicle body, is manufactured from a longitudinal metal blank by performing thereon a number of different metal cutting operations. As shown in Figure 6, apertures 38 and 72 define the ends of a particular length of carrier though do not completely severe the metal blank. At a region 42, the blank is unslotted. Over regions 44,52 and 66, different formations of slots are cut. A diamond-shaped aperture is formed at 62. The various cutting processes produce a channel-shaped metal carrier (Figure 8) having different slot formations along its length and thus having different characteristics to suit the different requirements at particular positions around the door opening. The diamond-shaped aperture 62 produces a V-shaped notch where the carrier may be bent at right angles to form a sharp corner. Apertures 38 and 72 facilitate precise cutting off of the length of carrier. The cutting operations may be performed continuously and automatically, according to a predetermined program, along the length of the blank.

Fig.6.

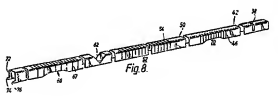

Fig.8.

EP 0 460 792 A2

The invention relates to metal reinforcements for sealing, trimming and glass-guiding strips and the like, to methods and apparatus for making such reinforcements, and to such strips incorporating the metal reinforcements. Metal reinforcements, commonly known as metal carriers, are often embedded in such strips of channel-shaped form. Such strips may be used, for example, in motor vehicle body construction for gripping attachment to metal flanges surrounding door and other body openings. The strips may support soft sealing sections, such as in tubular form, mounted on and running along an outside wall of the channel. Such a sealing section may be made of cellular rubber and is positioned so as to be partially compressed by the door or lid for the opening, thereby providing a weather proof seal.

According to the invention, there is provided a method of making a reinforcing metal carrier for use in a sealing, trimming or glass-guiding strip or the like, in which a plurality of metal cutting processes are performed along a predetermined continuous length of a metal blank, characterised in that the metal cutting processes performed at predetermined longitudinally spaced parts of the metal blank differ from each other in a predetermined manner so as to produce correspondingly varying characteristics in the carrier, each predetermined part of the blank remaining integrally connected to the next part or parts thereof.

According to the invention, there is further provided a method of forming a sharp corner in a length of channel-shaped strip, characterised by the step of forming a notch, generally "V-shaped in cross-section, through the channel at the point where the sharp corner is required and with the open mouth of the "V" lying in the base of the channel and the point of the "V" lying close to but spaced from the longitudinal edges of the two side walls of the channel so that the two longitudinal parts of the strip between which lies the notch remain connected together by marginal edge portions of the two side walls and so that the line running along the narrowest part of the notch is transverse to the length of the strip, bending the strip about the said line so as to close the opposed edges of the notch together, and securing the opposed edges of the notch together.

According to the invention, there is also provided a method of forming a sharp corner in a length of channel-shaped strip, characterised by the step of forming a generally diamond-shaped aperture in a flat blank so as to leave longitudinally extending marginal uncut edge portions of the blank on each side of the aperture, bending the blank into channel form so that the aperture produces a notch, generally "V-shaped in cross-section, through the channel at the point where the sharp corner is required and with the open mouth of the "V" lying in the base of the channel and the point of the "V" lying close to but spaced from the longitudinal edges of the two side walls of the channel so that the two longitudinal parts of the strip between which lies the notch remain connected together by the said marginal uncut edge portions and so that the line running along the narrowest part of the notch is transverse to the length of the strip, bending the strip about the said line so as to close the opposed edges of the notch together, and securing the opposed edges of the notch together.

According to the invention, there is still further a method of making a channel-shaped sealing, trimming or glass-guiding strip or the like with a predetermined end, characterised by the steps of processing a thin flat longitudinally-extending metal blank so as to produce therein a generally rectangularly-shaped aperture symmetrically positioned in relation to the longitudinal axis of the blank and spaced from the opposed longitudinal edges thereof by narrow marginal portions, bending the blank into channel-shape, and extruding plastics or rubber material or the like over, so as to coat and cover, the metal blank either before or after the latter has been bent into channel-form, whereby the said aperture defines the end of the strip and facilitates its cutting off at that point.

According to the invention, there is yet further apparatus for producing a channel-shaped metal reinforcing carrier for a sealing, trimming, or glass-guiding strip or the like, comprising means defining a working path, and cutter means disposed adjacent the working path and for performing cutting operations on a longitudinal metal blank when the latter is situated in the working path and it and the cutter means move relative to each other along the direction of the cutting path, characterised in that the cutter means comprises a plurality of cutter arrangements positioned along the working path and each for performing a different cutting operation on the blank, and by control means responsive to the relative movement and to the position at any time of the blank relative to each of the cutter arrangements for so operating the cutter arrangements that they perform their respective cutting operations on the blank at respective predetermined positions therealong, and by means situated along the working path for receiving the blank after performance of the cutting operations on it and forming it into channel-shape.

According to the invention, there is also provided a apparatus for producing a corner in a channel-shaped, sealing, trimming or glass-guiding strip or the like incorporating a channel-shaped metal carrier embedded in extruded plastics or rubber material, characterised by cutter means op-

erative to form a notch through the channel of the strip and which is generally "V"-shaped in cross-section with the open mouth of the "V" lying in the base of the channel and the point thereof lying close to but spaced from the longitudinally extending edges of the side walls thereof so that the two longitudinal parts of the strip on each side of the notch remain connected by narrow marginal edge portions of the two side walls, bending means for bending the strip about the transverse axis lying in the narrowest part of the notch so as to bring the extruded material around the edges of the notch together, and securing means for securing together the extruded material at the edges of the notch.

According to the invention, there is yet further provided a channel-shaped metal carrier having a plurality of slots distributed along its length between two predetermined end points, characterised in that the slots are arranged in respective groups of at least some of which the slots differ in shape or arrangement from those in other said groups, each group extending over a respective longitudinal region of the carrier between the end points.

According to the invention, there is still further provided a channel-shaped metal carrier, of continuous channel shape in cross-section characterised by having, over a portion of its length only, a channel side wall of lesser depth than the depth of the adjacent portion of the same side wall.

Metal carriers embodying the invention, methods according to the invention of making metal carriers, apparatus embodying the invention for making metal carriers, and sealing and similar strips embodying the invention, will all now be described, by way of example only, with reference to the accompanying diagrammatic drawings in which:

Figures 1,2 and 3 are perspective views of known forms of metal carrier;

Figure 4 is a cross-section of a sealing strip incorporating one of the metal carriers of Figures 1,2 and 3;

Figure 5 illustrates a known method for the formation of a mitred corner between two lengths of sealing strip each of the general type shown in Figure 4;

Figure 6 is a plan view of a length of metal blank showing the carrying out of various steps in the methods according to the invention;

Figure 7 is a diagrammatic side view of apparatus embodying the invention;

Figure 8 is a perspective view of a metal carrier formed in accordance with the invention from the blank of Fig. 6;

Figure 9 is a side view of one end of a sealing strip produced by the methods and apparatus of the invention; and

Figures 10 and 11 show the formation of a mitred corner in a length of sealing strip in accordance with the invention.

Referring to the drawings, Figures 1,2 and 3 show known forms of channel-shaped carrier. As shown in Figure 1, the metal carrier is in the form of U-shaped elements 5 whose distal ends are joined together by connecting links 6.

In the carrier shown in Figure 2, the U-shaped links 5 are joined together by connecting links 8 at the base of the U's.

In the carrier shown in Figure 3, the slots 10,12 each extend from one distal edge of the channel, up the corresponding side wall, and partway, only, across the base of the channel.

Figure 4 shows an end view of a strip 14 incorporating a metal carrier (shown generally at 16) which may be of any of the types shown in Figures 1 to 3, for example. As shown, the strip comprises channel-shaped extruded plastics or rubber material 20 in which is completely embedded the carrier 16. Such a strip may be manufactured using a cross-head extruder. The strip incorporates gripping lips 22 which are integrally extruded with the plastics or rubber material 20. In use, the strip is placed over and embracingly grips a flange 24 such as running around a vehicle door opening. The lips 22 help to secure the strip in position on the flange and provide improved sealing. The extrusion process may be such as to extrude the lips of a different hardness (for example, softer) than the channel-shaped extruded material. As shown, the strip may also include a soft tubular sealing section 28 such as made of foamed rubber for example. This sealing section may be extruded separately and adhesively secured to the channel-shaped extruded material or may be extruded integrally therewith. In use, the channel-shaped part supports the tubular sealing section so as to run around the outside of the door opening so that the door 29 closes on to it, partially compressing it to form a seal.

Sealing strips of the general form shown in Figure 4 may be supplied to the car manufacture in indefinite lengths and then placed on the flange around a particular vehicle door opening and cut off to length. Instead, however, they may be supplied in pre-formed closed loops, sized to fit a particular door opening. In certain cases, the door openings may have sharp corners, substantially right-angled corners for example. In such a case, it is necessary to pre-form a matching corner in the length of sealing strip. Figure 5 shows a conventional way of doing this, in which mitre cuts are formed at the ends of two lengths of sealing strip. These are then brought together and secured as by welding or glueing the plastics or rubber material together at 30. However, this process conventionally requires that the mitre cut be formed not

only through the extruded plastics or rubber material but also through the metal carrier. Depending on the particular form of carrier used, the action of cutting through it will or may leave separated metal pieces within the rubber or plastics at the mitre-cut ends and these pieces of metal must be removed before a successful joint can be made. This process is time-consuming and difficult to automate.

Different forms of metal carrier, such as the three forms shown in Figures 1,2 and 3 for example, have differing advantages. Some are more flexible than others. Some, such as the type of carrier shown in Figure 3, for example, provides better resistance to "puckering" of the plastics or rubber material when the strip is bent around a particular type of radius. In certain cases, a very flexible carrier is advantageous. In other applications, a more rigid carrier is required, such as for bridging over defects in a flange or for providing a particularly smooth external finish. Various different requirements may arise around a single door opening. In other words, for certain applications it would be advantageous to provide sealing strips in closed-loop form in which the carrier varied in construction around the loop with its construction in any region of the loop being best suited to the requirements (e.g. curvature of the flange, shape of the flange or adjacent body work, thickness of the flange, presence of spot welds or similar).

Where a length of strip has to be cut off with a straight cut (for example, where the two ends of a closed loop are to be secured together), there may also be a problem. The cutting action may result in there being separated pieces of metal partially held in place by the extruded material at the cut off end of the strip, and such pieces of metal must also be removed.

Figure 6 illustrates, diagrammatically, steps involved in a method according to the invention for producing a metal carrier. Here, a flat metal blank 32 is moved longitudinally from left to right through a programmed metal processing machine (not shown in this Figure). As the blank moves through the machine, programmed metal cutting operations take place at particular positions along the blank according to a predetermined program. The effects of some of these cutting operations are illustrated in Figure 6.

Thus, at position 38 a rectangular aperture is cut through the blank so as to leave the distal edges of the blank connected as shown at 40 and 41. In a manner to be explained in more detail, this rectangular aperture defines one end of a particular, eventually separate, length of carrier, this length of carrier lying to the left of the aperture 40 with another length of carrier lying to the right of it.

Over a region 42, the metal blank is left unaffected by the metal processing action.

Over a region 44, slots 46, running along opposite edges of the blank and leaving an unslotted central portion 48, are formed by the metal cutting machine. For ease of illustration, the slots are shown diagrammatically in the Figure merely by thin vertical lines but in practice would be actual slots (i.e. forming individual gaps in the metal).

There is then a region 50 where the blank is left unaffected and thereafter a region 52 where slots 54 are formed, these slots leaving unslotted marginal regions 56 and 58.

At a region 60, a diamond-shaped aperture 62 is formed, for a purpose to be described. This aperture 62 is spaced inwardly of marginal, unslotted, portions 63,64 of the blank.

Over a region 66, the blank is formed with slots 67 which are interdigitated with each other, the slots 67 each extending partway across the width of the blank.

As shown over a region 69, the metal blank is reduced in width, symmetrically from both sides. At a region 70, it is reduced in width from one side only.

Finally, at the region 71, a rectangular aperture 72 is formed, similar to the aperture 38, leaving marginal portions 74,76 uncut.

The machine for producing the various apertures and slots shown in Figure 6 can take various forms. One form is shown purely diagrammatically in side view in Figure 7. It comprises a series of rotary cutters 80,82,84,86, each rotatable about a generally horizontal axis and with its periphery adjacent to a respective roller 88,90,92,94. The path for the metal blank 32 passes between the bights of the respective cutter/roller combinations. Each of the cutters 80,82,84 and 86 can be raised and lowered in the directions of the arrows A so as to raise it clear of the metal blank 32.

A pair of drive rollers 96,98 continuously draw the metal blank 32 through the machine at a constant known speed. A sensor shown diagrammatically at 100 accurately monitors the speed of the strip and provides a corresponding electrical signal to a programming unit 102. Operating in accordance with a predetermined program, according to the particularly required arrangement of slots and apertures, such as those shown in the blank 32 in Figure 6, the programming unit 102 so raises and lowers the cutters 80,82,84,86 and rotates them relative to the metal blank when they are raised therefrom, that each cutter produces a required formation (a particular arrangement of slots or a particularly shaped aperture for example) at the correct linear position along the blank.

After the blank has been processed in this way, it may be temporarily stored on a reel, for example, for future use. Instead, it can be transported directly and continuously to a cross-head extruder

which embeds it in plastics or rubber material. Thereafter, the covered blank is then passed through suitably arranged pairs of rollers for forming it into channel-shape. Instead, however, it may be formed into channel-shape before being passed into the extruder.

Figure 8 shows the processed blank of Figure 6 bent into channel-form. As shown, it forms a continuous metal carrier. Over region 42, the carrier is in the form of an unapertured channel and is highly rigid over this region. Over region 44, the carrier takes the form of that shown in Figure 2. Over region 52, the carrier takes the form of that shown in Figure 1. Finally, over region 64, the carrier takes the form shown in Figure 3. In this way, therefore, a metal carrier can be produced whose form varies along its length in a predetermined way. Clearly, the forms of carrier illustrated in Figure 8 are merely a small number of the many different forms of carrier which can be produced in this way. It is in practice unlikely that the short length of carrier would be in the four different forms illustrated in Figure 8, but it is more than possible that two or three different forms could be used for a sealing strip extending in a closed loop around a particular door opening. The regions 69 and 70 (see Fig. 6) in the metal blank 32, where its width is reduced, enable the production of sealing strips with cross-sections to suit particular applications, such as, for example, for use where, over a region around the length of a flange surrounding a door opening, the flange is locally less deep or the sealing strip has to be shaped so as to pass a local obstruction.

As already explained, the metal is incorporated into the channel-shaped sealing strip using an extrusion process so as to cover it completely with extruded plastics or rubber material. This process may take place before or after the flat metal blank 32 (in the form shown in Figure 6) is bent into channel-shape. Advantageously, the extrusion process covers the metal edges around the apertures 38,62 and 72 with extruded material.

Prior to the extrusion step, it may be advantageous to apply inserts, such as made of plastics material, into the apertures 38,62 and 72, so as to be secured therein, in order to ensure that the overall thickness of the extrudate along the length of the carrier is substantially constant.

The description above with reference to Fig. 6 states that actual slots (46,48,54,67,68) are formed through the metal blank as shown; that is metal is actually cut out and discarded. Instead of forming such slots, however, corresponding narrow slits can be formed, that is, cuts extending through the material of the blank but not involving discard of any material. Thereafter, the metal blank is passed between the bight of one or more pairs of rollers which compress it and subject it to a stretching operation which elongates the blank and converts the slits into slots. Because this process involves no discard of material, it is more economical. It will be understood that such slits may be formed in exactly the same way, that is, by using programmed rotary cutters as shown in Figure 7, as for the slots. In this case, however, the programming has to take into account the fact that the blank will be stretched after the slitting process. In certain cases, or positions along the carrier, however, such slits would not be converted into slots. That is, the finished carrier would be in the original slitted form.

As stated above, the apertures 38 and 72 define the ends of a particular length of carrier. After the formed continuous carrier has been subjected to the extrusion process, it may be readily cut to length by means of a cutting blade which passes through the apertures 38 and 72, severing the extruded plastics or rubber material which will now cover these apertures and severing the thin metal marginal connecting pieces 40,41 and 74,76. Such a severing operation may be carried out automatically as the strip moves longitudinally, the operation being under control of suitable electronic apparatus which senses the position of each aperture 38,72.

Each such severed end produced in this way will have the general appearance shown in end view in Figure 9. The left hand end of the carrier shown in Figure 8 illustrates the form which the carrier takes after such a severing operation.

Thus, the end region of the strip will be locally clear of any metal except for the severed marginal regions 40,41 and 74,76. No action will be necessary to remove any separated pieces of metal. Two strip ends, each corresponding to that shown in Figure 9, can be easily butted and secured together such as by hot melt welding or adhesive. The marginal metal ends 40,41 and 72,74 are sufficiently small and thin to be left in position; as the two mating ends of the length of sealing strip are brought together, the meeting metal ends on each side of the strip will overlap with each other.

It may be necessary or advisable, particularly where the carrier is completely unapertured or merely slit (not slotted), to cover the carrier with a suitable bonding agent before the extrusion step to facilitate bending of the extrudate to the metal.

The purpose of the diamond-shaped aperture 62 is to enable a sharp corner to be formed in the length of sealing strip. The process is illustrated in Figures 10 and 11. It is merely necessary to remove the extruded plastics or rubber material where it will have covered the aperture 62, so as to leave an open generally V-shaped notch 90 (see Figure 10), and then to bend the sealing strip into

the required right angle shape as shown in Figure 11. The plastics or rubber material around the edges of the diamond-shaped aperture come together and can be secured together by welding or adhesive as shown at 92. Throughout this process, the continuous marginal metal connections 63,64 (see Fig. 6) remain integral and need not be cut through.

The step of removing the extrudate from the aperture is advantageously carried out before the flat blank is formed into channel shape.

Because the strip is in continuous form throughout this corner-forming process, the process itself can be substantially completed automated in a simple way. This contrasts with the formation of corners between separate lengths of sealing strip. This involves forming mitre cuts in the ends of the sealing strip to be joined, the removal of any separated metal pieces, the bringing together of the two mitre-cut ends, and there joining as by welding or adhesive. This process is very difficult to automate satisfactorily.

Although the above description has described the formation of a continuous carrier having different patterns of slots successively arranged along an integral strip, it is also possible to form a carrier of the type shown in Figure 8 by welding end to end separate lengths of corner, each such length being separately machined to have a particular pattern of slots therein. Such a welded length of carrier can be formed with apertures corresponding to apertures 38,62 and 72 for the purposes described and/or the waisted portions 69 and 70.

Although the diamond-shaped aperture 62 has been shown as formed in an unslotted (and unslitted) part of the carrier, in practice it may well be formed in a slotted or slitted part.

Although the metal carriers illustrated have been shown to be of channel-form, this is not necessary. The methods described can be used to produce carriers of any suitable form, such as of square or rectangular cross-section.

Claims

1. A method of making a reinforcing metal carrier (16) for use in a sealing, trimming or glass-guiding strip or the like, in which a plurality of metal cutting processes are performed along a predetermined continuous length of a metal blank (32), characterised in that the metal cutting processes performed at predetermined longitudinally spaced parts of the metal blank (32) differ from each other in a predetermined manner so as to produce correspondingly varying characteristics in the carrier (16), each predetermined part of the blank remaining integrally connected to the next part or parts thereof.

2. A method according to claim 1, characterised in that one metal cutting process comprises the step of cutting a predetermined formation of slots through the blank (32).

3. A method according to claim 1, characterised in that one metal cutting process comprises the step of cutting a predetermined formation of slits through the blank (32) and the step of thereafter thinning the metal of the blank (32) so as to stretch it and expand the slits into slots.

4. A method according to any preceding claim, characterised in that one of the metal cutting processes comprises the step of cutting a substantially rectangular aperture (38,72) through the metal blank (32) at each of two positions defining the ends of the metal carrier (16), each aperture (38,72) leaving two integral marginal portions (40,41,74,76) uncut and running along each edge of the blank (32).

5. A method according to any preceding claim, characterised by the step of embedding the metal carrier (16) in extruded plastics or rubber material (20).

6. A method according to claim 5, characterised by the step of forming the metal carrier (16) into channel-form before or after the extrusion step.

7. A method according to claim 6, characterised in that one of the metal cutting processes comprises the step of cutting a substantially diamond-shaped aperture (62) through the metal blank (32) with two of its apices lying substantially on the longitudinal axis of the blank (32) and the other two substantially on an axis normal thereto but respectively spaced inwardly from the edges of the blank so as to leave thin uncut marginal edge regions (63,64), and by carrying out the following steps after the extrusion step and the step of forming the carrier (16) into channel-shape: removing extruded material covering at least part of the said aperture (62), bending the carrier substantially about the said normal axis so as to bring the extruded plastics or rubber material (20) around the periphery of the aperture (62) into contact with itself and thereby form a sharp corner in the channel, and securing the extruded material (20) together where it is in contact.

8. A method of forming a sharp corner in a length of channel-shaped strip, characterised by the step of forming a notch (62, Fig. 8), generally "V-shaped in cross-section, through the channel at the point where the sharp corner is required and with the open mouth of the "V" lying in the base of the channel and the point of the "V" lying close to but spaced from the longitudinal edges of the two side walls of the channel so that the two longitudinal parts of the strip between which lies the notch (62) remain connected together by marginal edge portions of the two side walls and so that the line running along the narrowest part of the notch is transverse to the length of the strip, bending the strip about the said line so as to close the opposed edges of the notch (62) together, and securing the opposed edges of the notch (62) together.

9. A method according to claim 8, characterised in that the channel is formed by bending a generally flat metal blank (32) into channel-form, and in that the step of forming the said notch (62) comprises the step of forming in the generally flat blank an aperture of such shape that it produces the said notch (62) in the channel after the blank (32) has been formed into channel-form.

10. A method according to claim 9, characterised in that the aperture (62, Fig. 6) is generally diamond-shaped.

11. A method of forming a sharp corner in a length of channel-shaped strip, characterised by the step of forming a generally diamond-shaped aperture (62, Fig. 6) in a flat blank (32) so as to leave longitudinally extending marginal uncut edge portions of the blank on each side of the aperture, bending the blank (32) into channel form so that the aperture produces a notch (62, Fig. 8), generally "V-shaped in cross-section, through the channel at the point where the sharp corner is required and with the open mouth of the "V" lying in the base of the channel and the point of the "V" lying close to but spaced from the longitudinal edges of the two side walls of the channel so that the two longitudinal parts of the strip between which lies the notch (62) remain connected together by the said marginal uncut edge portions and so that the line running along the narrowest part of the notch is transverse to the length of the strip, bending the strip about the said line so as to close the opposed edges of the notch (62) together, and securing the opposed edges of the notch (62) together.

12. A method according to claim 9,10 or 11, characterised by the step of covering the metal with a covering of extruded plastics or rubber material (20) after formation of the said aperture (62, Fig. 6) and before or after the blank (32) has been formed into channel-form, and by the step of removing extruded plastics or rubber material (20) over the said aperture (62, Fig. 6) so as to leave clear the V-shaped notch (62, Fig. 8).

13. A method according to claim 12, characterised in that the step of securing the closed edges of the notch (62, Fig. 8) together comprises the step of welding or adhering together the plastics or rubber material (20) at the closed-together edges.

14. A method of making a channel-shaped sealing, trimming or glass-guiding strip or the like with a predetermined end, characterised by the steps of processing a thin flat longitudinally-extending metal blank (32) so as to produce therein a generally rectangularly-shaped aperture (38,72) symmetrically positioned in relation to the longitudinal axis of the blank and spaced from the opposed longitudinal edges thereof by narrow marginal portions (40,41;74,76), bending the blank (32) into channel-shape, and extruding plastics or rubber material (32) or the like over, so as to coat and cover, the metal blank (32) either before or after the latter has been bent into channel-form, whereby the said aperture (38,72) defines the end of the strip and facilitates its cutting off at that point.

15. A method according to claim 14, characterised by the step of cutting the strip by means of a cutter passing through the said aperture (38,72) after the blank has been bent into channel-form and covered with the extruded material (20).

16. A method according to claim 15, characterised by the step of automatically sensing for the position of each said aperture (38,72) and controlling the cutting step accordingly.

17. Apparatus for producing a channel-shaped metal reinforcing carrier (16) for a sealing, trimming, or glass-guiding strip or the like, comprising means defining a working path (Fig. 7), and cutter means (80,82,84,86) disposed adjacent the working path and for performing cutting operations on a longitudinal metal blank (32) when the latter is situated in the working path and it and the cutter means move relative

to each other along the direction of the cutting path, characterised in that the cutter means comprises a plurality of cutter arrangements (80,82,84,86) positioned along the working path and each for performing a different cutting operation on the blank (32), and by control means (100,102) responsive to the relative movement and to the position at any time of the blank (32) relative to each of the cutter arrangements (80,82,84,86) for so operating the cutter arrangements (80,82,84,86) that they perform their respective cutting operations on the blank (32) at respective predetermined positions therealong, and by means situated along the working path for receiving the blank after performance of the cutting operations on it and forming it into channel-shape.

18. Apparatus according to claim 17, characterised by plastics or rubber extrusion means situated along the working path for covering the blank (32) with extruded plastics or rubber material (20) after performance of the cutting operations thereon.

19. Apparatus according to claim 18, characterised in that one of the said cutter means arrangements (80,82,84,86) comprises means for cutting a substantially rectangularly-shaped aperture (38,72) through the blank at at least one of two positions therealong defining the respective ends of a predetermined length, the or each of the apertures (38,72) extending across the width of the blank and terminating short of the edges thereof so as to leave narrow metal marginal portions (40,41;74,76) of the blank (32) uncut, and by further cutter means positioned to receive the carrier (16) after it has been covered with the extruded plastics or rubber material (20) and operative to cut through the extruded material (20) at the or each of the said apertures (38,72) and through the narrow marginal portions there (40,41;74,76).

20. Apparatus according to claim 18 or 19, characterised in that one of the cutter arrangements (80,82,84,86) comprises means for cutting a substantially diamond-shaped aperture (62) at a predetermined position along the length of the metal blank (32), the diamond-shaped aperture (62) being symmetrically positioned with respect to the longitudinal and transverse axes of the blank (32), the aperture (62) being so positioned as to leave uncut narrow metal marginal edge portions (63,64) of the blank (32) on opposite sides of the aperture (62) whereby, after the blank (32) has been formed into channel-shape, the said aperture (62) forms a notch (62, Fig. 8) through the channel of generally "V"-shape in cross-section with the open mouth of the "V" lying in the base of the channel and the point thereof lying close to but spaced from the longitudinally extending edges of the side walls thereof by the said narrow marginal edge portions (63,64), and by means for receiving the carrier (16) after it has been covered with the extruded plastics or rubber material (20) and operative to remove at least some of the extruded material (20) covering the diamond-shaped aperture (62) and to bend the covered carrier (16) at the diamond-shaped aperture (62) about the transverse axis lying in the narrowest part of the notch so as to bring the opposed edges of the diamond-shaped apertue (62) together and to bend the metal marginal edge portions (63,64) and by means for securing together the extruded material (20) at the opposed edges of the diamond-shaped aperture (62), thereby forming a corner in the covered carrier (16).

21. Apparatus for producing a corner in a channel-shaped, sealing, trimming or glass-gulding strip or the like incorporating a channel-shaped metal carrier (16) embedded in extruded plastics or rubber material (20), characterised by cutter means operative to form a notch (62, Fig. 8) through the channel of the strip and which is generally "V"-shaped in cross-section with the open mouth of the "V" lying in the base of the channel and the point thereof lying close to but spaced from the longitudinally extending edges of the side walls thereof so that the two longitudinal parts of the strip on each side of the notch (62) remain connected by narrow marginal edge portions (63,64) of the two side walls, bending means for bending the strip about the transverse axis lying in the narrowest part of the notch so as to bring the extruded material (20) around the edges of the notch together, and securing means for securing together the extruded material (20) at the edges of the notch.

22. Apparatus according to claim 21, characterised in that the means for forming the notch (62, Fig. 8) comprises cutter means for cutting a generally diamond-shaped aperture (62, Fig. 6) in a flat metal blank (32) with the aperture (62) being generally symmetrically positioned with respect to the longitudinal and transverse axes of the blank and spaced inwardly from each of the two longitudinal edges of the blank by narrow metal marginal edge portions (63,64) and means for forming the metal blank (32)

into channel-shape so as to produce the carrier (16) and such that the diamond-shaped aperture (62) forms the generally "V"-shaped notch (62, Fig. 8) in the carrier (16) and by extrusion means for extruding plastics or rubber material (20) over the metal (32) before or after it has been formed in to the channel-shape, and means for removing at least some of the extruded material (20) covering the aperture or notch (62).

23. A carrier (16) for a sealing, trimming or glass-guiding strip, or a sealing, trimming or glass-guiding strip incorporating a carrier (16), the carrier (16) or the strip being characterised in that it is made by a method or by apparatus according to any preceding claim.

24. A channel-shaped metal carrier having a plurality of slots distributed along its length between two predetermined end points (38,72), characterised in that the slots are arranged in respective groups of at least some of which the slots differ in shape or arrangement from those in other said groups, each group extending over a respective longitudinal region of the carrier between the end points (38,72).

25. A carrier according to claim 24, characterised in that it is apertured at each of the end points by respective apertures (38,72) which leave the two longitudinal parts of the carrier on each side of each end point connected only by marginal edge portions (40,41;74,76) of the two side walls of the channel.

26. A carrier according to claim 24 or 25, characterised in that it is integral along the length between the end points (38,72).

27. A carrier according to any one of claims 24 to 26, characterised by a notch (62) through the channel at a predetermined position between the two end points, the notch (62) being generally "V"-shaped in cross-section (Fig. 8) with the open mouth of the "V" lying in the base of the channel and the point thereof lying close to but spaced from the edges of the side walls thereof so that the two longitudinal parts of the carrier on each side of the notch remain connected by marginal edge portions (62,64) of the two side walls.

28. A channel-shaped metal carrier, of continuous channel shape in cross-section characterised by having, over a portion (66,70) of its length only, a channel side wall of lesser depth than the depth of the adjacent portion of the same side wall.

29. A carrier according to claim 28, characterised in that there is a respective portion of channel side wall of the lesser depth on each side of the channel.

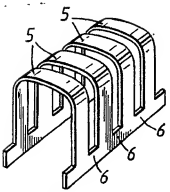

Fig.1.

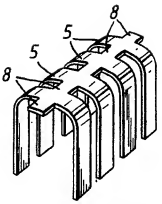

Fig.2.

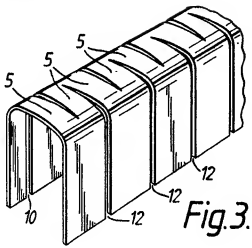

Fig.3.

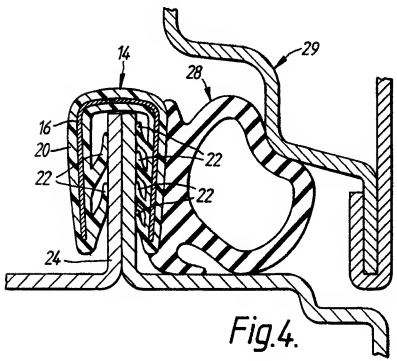

Fig.4.

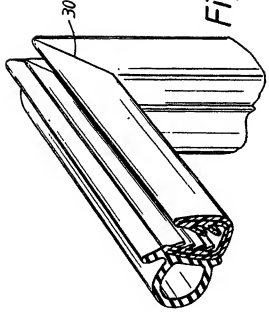
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Fig.5.

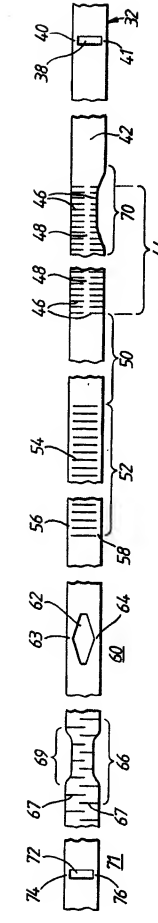
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Fig.6.

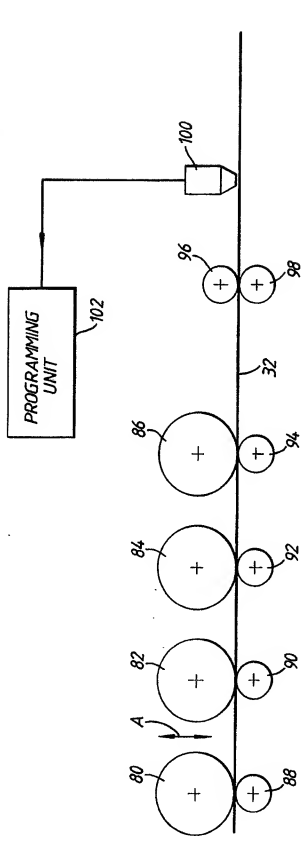

Fig. 7.

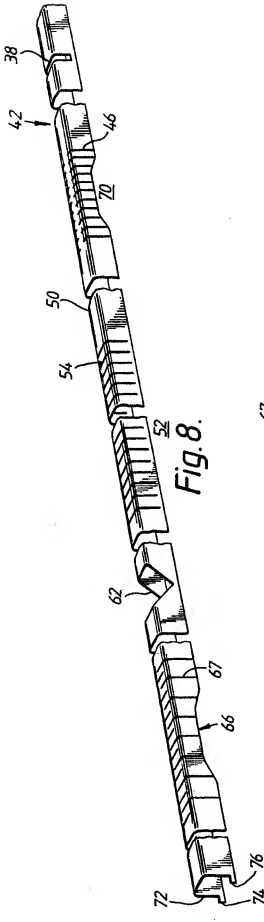

Fig.8.

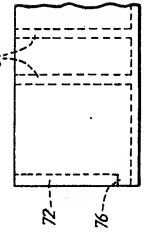

Fig.9.

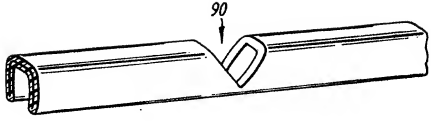

Fig. 10.

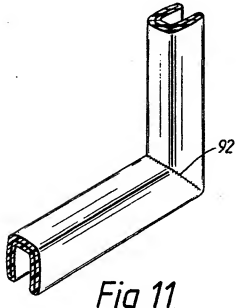

Fig. 11.